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published in
European Environment
2006

DOI (link to publisher)
10.1002/eet.414

document version
Publisher's PDF, also known as Version of record

European Environment
Eur. Env. **16**, 139–154 (2006)
Published online in Wiley InterScience
(www.interscience.wiley.com) **DOI**: 10.1002/eet.414

Corruption and Environmental Policies: What Are the Implications for the Enlarged EU?

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ABSTRACT
The paper discusses the prescription of EU environmental regulations for new member states. It has been argued that these countries should be allowed looser directives as a way to take into consideration their lower income levels and correspondingly different priorities. The paper estimates the determinants of environmental policies' stringency. We find that corruption levels are the most important factor in explaining the variance in environmental policies in the enlarged EU. Most notably, differences in corruption levels across countries appear to be more important than income differences. Thus, it is argued, lower environmental standards in new member states are not necessarily implied by lower income levels, but they are more likely to reflect low institutional quality. We argue that harmonization of environmental policies at the EU level can be a way to tackle this problem, and we provide a further rationale for new members states to adjust to existing EU environmental directives. Copyright © 2006 John Wiley & Sons, Ltd and ERP Environment.

Received 11 May 2005; revised 10 February 2006; accepted 27 February 2006
Keywords: corruption; European Union; environmental policy

Introduction

FOR DECADES THE EUROPEAN UNION (EU) HAS DEVELOPED A GROWING BODY OF ENVIRONMENTAL policies. The earliest European legislation on environmental issues dates from 1959, when a directive on radiation safety standards was passed into law (Tamara, 1997). In 1972, the European Community instructed the Commission to draw up the First Environmental Action Programme (Andersen and Liefferink, 1997), the first comprehensive environmental policy initiative. The attention for environmental protection is apparent, also from its explicit mentioning in recent treaties such as the 'Consolidated Version of the Treaty Establishing the European Community' (emended in Maastricht, 1992) and the 'Treaty on European Union' (also known as the 'Maastricht Treaty', 1992). In the European Union's draft Constitution – signed on 29 October 2004 – sustainable

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Figure 1. Environmental Regulatory Regime Index (ERRI). A darker colour indicates more stringent environmental policies. Only countries that are EU members or candidates and for which the ERRI is available are included in the map

development and 'a high level of protection and improvement of the quality of the environment' are mentioned already in the first article among the main objectives of the Union.

In 2004, ten new states entered the EU: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia. Relative to the pre-2004 or 'old' member states, these accession states have lower environmental standards, and some worry that it will be too demanding for these new EU members to fully comply with European environmental provisions.[1] Nonetheless, a remarkable effort has been undertaken by the EU in order to secure compliance. In the Act of Accession of the ten new members, among the permanent provisions, there is a list of environmental issues on which there is the need of adopting and implementing the EU environmental *acquis*[2] at the national level. Figure 1 offers a geographical representation of the stringency of environmental regulations across EU countries,[3] and portrays the situation in which newer members of the EU have generally lower environmental policy standards.

The case for the European Union's environmental policies, however, cannot be taken for granted. The European Union member states are heterogeneous, and in the environmental sphere this diversity has introduced fears of excessive regulations. These regulations could damage welfare levels as they detract resources that could be devoted to more urgent needs according to national priorities. As it is generally accepted that demand for environmental quality (as a normal good) increases with income, there is an argument that poorer countries *prefer* to opt for laxer environmental policies, avoiding the investment in environmental protection of an unduly high share of their income. This type of reasoning gains

[1] We note that less stringent environmental standards are not necessarily associated with lower environmental quality and that with respect to environmental pressures and quality the situation of new EU members is uneven, depending on the issue (see, e.g., European Environment Agency, 2003).
[2] *Acquis Communautaire* is the expression used, in European Union law, to refer to all the regulations accumulated over time in the EU.
[3] The figure is based on the Environmental Regulatory Regime Index, which is described below when we use it in our statistical analysis. The maps are from the *ESRI Data & Maps* CD-ROM (Environmental Systems Research Institute, 1999).

DOI: 10.1002/eet

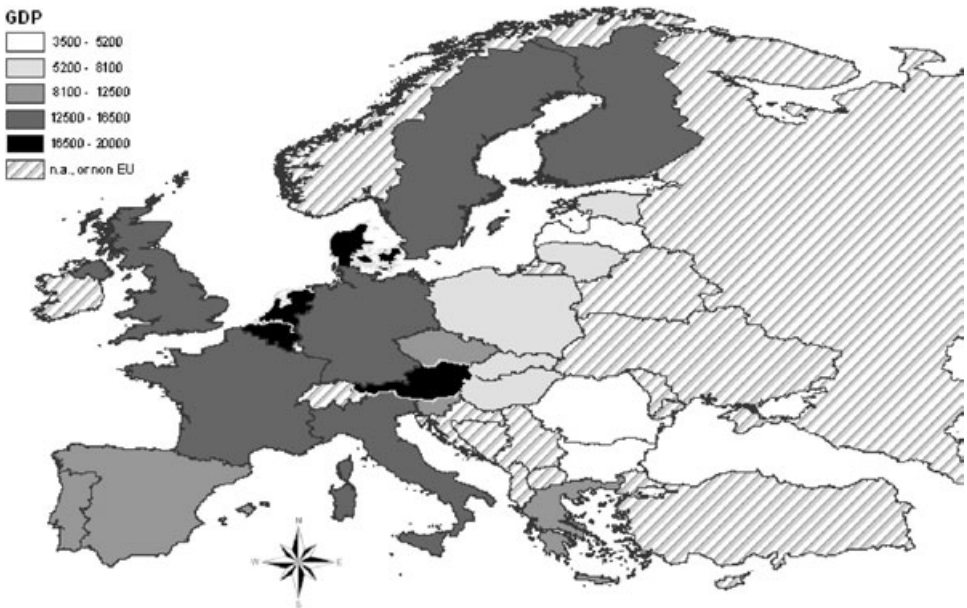

Figure 2. GDP per capita (measured in 1997 in Euro adjusted for purchasing power parity). A darker colour indicates higher GDP levels. Only countries that are EU members or candidates and for which the ERRI is available are included in the map

further relevance as the new member states have, on average, a lower level of income than older member states. Therefore, preferences among EU states will be further diversified – because of increasing differences in income levels – and some countries in the enlarged EU will be less sensitive towards environmental issues.[4] Moreover, environmental issues and ecological conditions differ from country to country and a uniform approach to environmental policies can have disproportionately high costs for some countries without producing adequate benefits (Haigh, 1992). Figure 2 shows the geographical variance in income levels; it appears that new members and candidates are generally characterized by lower income levels.

At the same time, there are various arguments that explain the EU effort to protect environmental quality equally in old and new member states. The most fundamental one – which is cited most often in official documents (such as the above mentioned treaties) – is that the EU is more than a group of countries harmonizing their regulations in order to exploit the access to a larger common market. The European Union is a political subject and the welfare of the EU citizens is at the centre of its concerns. It therefore has an active attitude towards countries that are lagging behind in defending the interests of their citizens and the political project of the EU, and these countries are to some extent forced to catch up with the European *aquis*. This stand is clearly present in the Maastricht Treaty.

Another argument, non-specific to the EU as a political subject, is that many environmental problems have trans-boundary effects on neighbouring countries. In the case of these pollutants, the EU is an obvious forum for member countries to regulate these sorts of externality. On similar grounds, as the EU is an integrated market, the application of different environmental policies that result in cost differentials would promote the transfer of polluting production activities from countries with more stringent policies to countries with looser environmental policies (Andersen and Liefferink, 1997; Weale

[4] See Tefertiller, 2001, for similar arguments used in a US context.

DOI: 10.1002/eet

et al., 2000, pp. 34–37). The introduction of differentiated policies in an integrated market would produce pollution leakage: the environment would not benefit optimally from the environmental protective provisions and the most environmentally concerned countries would be economically harmed.

There is ample evidence that income affects environmental policies. Pellegrini and Gerlagh (2006) provide econometric estimates for the – expected – positive relationship between income and environmental policy stringency. At the same time, the authors highlight a main role for corruption in shaping the stringency of environmental policies. In this paper, we reproduce some estimates of the determinants of environmental policy stringency and we relate them to the realm of environmental policies in the EU. Through further statistical analysis, this paper argues that applying these findings to the environmental arena in the EU underscores the rationale for the Union's interventions in environmental policies, including the provision of higher environmental standards in the new member states. It also supports the EU's active role in environmental policies, as citizens' concerns are often better served by the EU effort to achieve an upward environmental harmonization, compared to the country level policymaking where environmental protection is more often affected by domestic corruption.

The paper is organized as follows. The second section gives an account of the academic discussion on the determinants of environmental policy stringency and it presents some econometric results; the third section puts in relation environmental policies with institutional settings in the EU; the fourth section – drawing from the preceding analysis – discusses the implications of our findings for EU's stand on environmental policies and concludes.

Determinants of Environmental Policy Stringency

Economic theory suggests that the environment (or environmental quality) can be treated either as a normal or as a luxury good: its demand increases with income. Increased demand of environmental quality for high income levels is one of the main explanations backing the environment Kuznets curve (EKC, Grossman and Krueger, 1995), the commonly observed path along which environmental degradation is on the rise jointly with income growth for low levels of income, while after a turning point further increases in income correspond to a fall in pollution levels.[5] One of the arguments explaining the inverted-U income–pollution relationship is the increased demand for environmental quality caused by increases in income, together with an assumed policy response (for a discussion see Roca, 2003).

Other literature strands have highlighted the effects of institutional settings on building environmental policies. For example, the linkages among democracy and the environment have been discussed many times (Payne, 1995; Neumayer, 2002). Likewise, the literature has also analysed the effects of corruption on the formulation and implementation of environmental policies (Lopez and Mitra, 2000; Damania, 2002). From the political science perspective the literature highlighted the complexity of societal requirements for addressing environmental issues (e.g. Weidner, 2002).[6]

Recently, a strand of empirical literature has developed on the determinants of environmental quality (the above mentioned EKC is one example), and also estimates have been produced on the determinants of environmental policies (for a recent review see Pellegrini and Gerlagh, 2006). From a political economy perspective it is no surprise to find that environmental policies are affected by the quality of governance structures. When environmental regulation harms economically endowed and concentrated

[5] For methodological and statistical assessments of the EKC, see Spangenberg, 2001; Harbaugh *et al.*, 2002.
[6] With the capacity-building approach, Weidner (2002) analyses 30 case studies from the ecological modernization point of view. The author is able to identify time cycles, influences of forerunners, institutional capacities and diffusion of environmental innovation (and its pace and pattern) as relevant determinants of ecological modernization.

DOI: 10.1002/eet

interests, those affected negatively can easily raise funds to influence policy-makers and bureaucrats in order to deter the emanation of costly regulations.

On the other hand, the benefits of most environmental policies are common goods affecting the polity at large, thus common citizens face a coordination problem when they would need to collect resources for buying influence in order to have the environmental regulations enacted. There is thus a need for high-quality institutions that put the polity's interest in focus, and that prevent self-interested policy-makers from maximizing their own benefits. Also, when policy-makers decide to set up environmental regulation, but bureaucrats are susceptible to bribes, the implementation of policies and the achievement of environmental objectives becomes problematic. Thus, the argument applies both to making of environmental regulation and the enforcement of written policy, and both grand and petty corruption would have a bearing on environmental policies.

Cross-Country Evidence

First, we produce econometric estimates of the determinants of stringency of environmental policies in a cross-section of countries. Subsequently, we focus on the set of countries that are within the sphere of influence of EU's environmental policies, i.e. old and new members, and candidate countries.

Using two sets of indexes of the stringency of environmental policy, Pellegrini and Gerlagh (2006) find, in two cross-sections of countries referring to two different time frames, that the main determinant of environmental policies is the country's level of corruption. First, the authors carry out regressions that identify the determinants of the index of Environmental Policy Stringency (EPS), which refers to the year 1991 and is based on data gathered for the UN summit in Rio de Janeiro in 1992 (see also Eliste and Fredriksson, 2002). Second, they perform a similar econometric analysis for the Environmental Regulatory Regime Index (ERRI), which was compiled in 2002 and is based on a sub-set of the indexes forming the Environmental Sustainability Index, augmented by data from the competitiveness survey of the World Economic Forum (see also Esty and Porter, 2002). Both these indexes refer to environmental policies in an extensive way. They measure the stringency of the stated objectives and use the available information on environmental qualities, and evaluate the presence of institutions implementing them and the quality of the regulatory framework. Moreover, the ERRI also looks at the actual share of environmental expenditures in the budget of firms in different countries, thus evaluating not only the stated objectives, but also the implementation of environmental policies.

On the side of the independent variables, it must be noted that the effect on environmental policy attributed to corruption could partially include the effect of other institutional deficiencies of a country. One often cannot use multiple alternative measures of institutional quality, as these are too correlated to disentangle each one's effect on environmental policy. Thus, even though it is safe to say that the main driver of our statistical results is corruption, it is worth noting that some omitted variables, strongly correlated to corruption, can contribute to the result. Indeed, the presence of corruption will most likely implicate, for example, a lack of rule of the law and a lack of efficient and independent judiciary power.[7] At the same time, we should not take the argument too far in favour of a broad interpretation. Many institutional features (e.g. decentralization, veto points in the legislature, guarantees of environmental quality in the constitution etc.) are not correlated with corruption. The impacts of these institutional variables (that do not correlate with corruption and are omitted from the regressions) on environmental policies are not captured in the corruption's coefficient.

[7] When we tried running regressions that would include additional explanatory variables from Kaufmann *et al.*, 2004, the result was that the variance inflation factor, for some variables including corruption, was up to more than 20 (with the conventional level of multicollinearity detection set at 10).

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	Mean	Standard deviation	Min	Max
ERRI	4.2	2.5	0.0	10.0
Income (ln GDP/cap)	8.8	0.8	6.7	10.0
Corruption	5.0	2.4	0.1	9.6
Schooling	7.7	2.4	2.4	12.2
Urbanization	0.7	0.2	0.2	1.0

Table 1. Descriptive statistics
Descriptive statistics for the 66 observations sample (as in Regression (2)).

In this paper, we present an econometric analysis on the determinants of the stringency of environmental policies, making use of ERRI as a dependent variable. The choice of this indicator of the stringency of environmental policies is based on the fact that most European countries are included in the sample of countries for which the index is available. Furthermore, the base year for the EPS is 1991 and the former communist countries of Eastern Europe have undergone dramatic institutional and environmental policy changes over the last decade. The ERRI, which is compiled for the year 2001, is more relevant for the actual environmental policy of Europe.[8] Last, as already mentioned, we notice that the ERRI has the advantage of also including measures of environmental policy implementation. For this index, and for the other variables, see Table 1 for the descriptive statistics.

Furthermore, we use, as a proxy of corruption levels, the Corruption Perceptions Index gathered by Transparency International. The Corruption Perceptions Index is a composite index based on interviews of 'credible' sources (Lambsdorff, 2001), where the definition of corruption is 'the abuse of power for private interest'. The scores of the index range from 0 to 10, where a low (high) score indicates low (high) levels of corruption.[9] The income proxy is the natural logarithm of GDP, adjusted for purchasing power parity, from the Summers and Heston database, and refers to the year 1997.

In order to estimate the influences of income and corruption on the formulation and implementation of environmental policies, we estimate the following regression:

$$ERRI^i = \alpha_0 + \alpha_1 \ln(Y^i) + \alpha_2 Corr^i + \alpha_3 Z^i + \varepsilon^i \quad (1)$$

where the superscript i denotes each country in the sample, ERRI is the Environmental Regulatory Regime Index, Y is income per capita in 1997 and Corr is the Corruption Perception Index referring to 2001. Finally, Z is a vector of additional explanatory variables that are introduced in order to check the robustness of our findings.[10]

The results of the regressions are reported in Table 2. Regression (1), showing the correlation between income and environmental policy, reproduces the finding we expect from economic theory: richer countries tend to have more stringent environmental policies. The income variable has a statistically

[8] An extensive econometric analysis similar to the one undertaken here, but including EPS as a dependent variable, can be found in Pellegrini and Gerlagh, 2006. The authors used slightly different time frames and variables in their analysis. Most notably, they estimated also the effects of democracy on policy stringency, including a democracy index in their regressions. Here the democracy variable is omitted as there is little variation in the value of the democracy indexes within European countries and because the democracy variable – from the Polity IV project – was not significant in any of our regressions.
[9] For a summary of advantages, and disadvantages, of perceptive corruption indexes cfr. Mauro, 1997, p. 83.
[10] Our regression methodology is based on the assumption that causality is unidirectional: the effect of the dependent variable (ERRI) on the independent variables (including corruption) is negligible.

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Independent variables	(1) ERRI	(2) ERRI	(3) ERRI	(4) ERRI	(5) ERRI
Income	2.51***	0.51**	0.69**	0.47*	1.93**
	(12.65)	(2.00)	(2.23)	(1.71)	(2.82)
Corruption		−0.80***	−0.79***	−0.75***	−0.61***
		(8.46)	(7.57)	(6.56)	(3.52)
Schooling			0.06	0.12	0.32***
			(0.63)	(1.06)	(2.99)
Urbanization			−1.40*	−1.34*	0.72
			(1.67)	(1.69)	(0.33)
Old EU members				0.68	
				(1.59)	
R^2	0.70	0.86	0.87	0.87	0.88
Number of countries	69	66	59	59	21

Table 2. Regressions as in Equation (1)
OLS estimation with the Environmental Regulatory Regime Index as dependent variable. Old EU members is a dummy variable for pre-2004 EU members. The constants are included in the regressions, but the coefficients are omitted from the table. Superscripts *, ** and *** correspond to 10, 5 and 1% significance, respectively. *t*-statistics, based on robust standard errors, are in parenthesis under the coefficients. Regression (4), our favourite model, passes the RESET test (checking for misspecifications) and does not have outliers with high leverage, and the variance inflation factor is lower than 10 for every variable (indicating that multicollinearity is not a major problem).

significant coefficient and a one standard deviation in the value of the income variable is associated with an increase of the environmental policy index by more than 0.8 standard deviations.[11]

In Regression (2), once we include the corruption variable, we notice a drastic drop in the absolute value of the coefficient of the income variable: from 2.5 to 0.5. The statistical significance is also reduced and the coefficient is significant only at 5%. At the same time, the coefficient on the corruption variable is sizeable in magnitude and is highly significant. Now, corruption turns out to be more important, as in this regression a one standard deviation change in corruption is associated with a 0.8 standard deviation change in the ERRI. A comparison of the two first regressions suggests that the coefficient of the income variable from Regression (1) is inflated by an omitted variable bias. When the income and corruption proxies are included together in the regression, the effect of corruption appears to dominate the effect of income. Further evidence of the association between corruption and environmental policy is provided by the scatter plot in Figure 3, where we plot the ERRI variable against the corruption perception index.

In Regression (3) schooling and urbanization are included as explanatory variables, following Pellegrini and Gerlagh (2006). The schooling variable expresses the number of years spent at school, on average, for the population above 25 years old in 2000. The urbanization variable is the percentage of the total population that lives in urban areas in 1999. In general we would expect that the schooling variable would have a positive bearing on environmental policy stringency: the more educated the population, the more aware the citizens are about environmental problems. Moreover, a more educated polity will better be able to scrutinize measures that policy-makers put in place to tackle environmental

[11] We interpret some of the results in standardized terms: we consider what change, in standard deviation terms, in the dependent variable is associated with a one standard deviation change in the independent variable.

DOI: 10.1002/eet

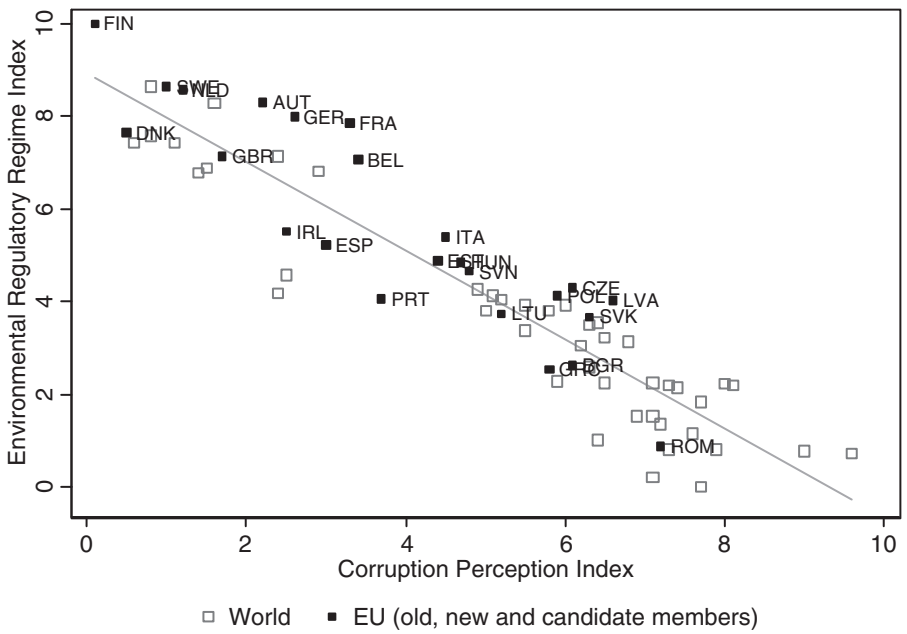

Figure 3. Scatter plot for corruption and the Environmental Regulatory Regime Index. The regression line is estimated to fit all countries in the sample, not only EU countries

issues. The coefficient of the schooling variable is indeed positive, but it is very small in absolute terms and insignificant. The urbanization variable has an unclear predicted effect. On the one hand, increased urbanization is associated with more concentrated population and urban citizens can more easily co-operate in order to push policy-makers to undertake measures, such as setting environmental standards, that satisfy their preferences. On the other hand, a highly urbanized population, more detached from nature, may be less interested in environmental protection. In our analysis, we find some weak evidence of the second effect dominating; the coefficient on urbanization is negative, but significant only at about 10% level (see also Pellegrini and Gerlagh, 2006). A side effect of these additional variables is the increased size and statistical significance of the coefficient of income, whereas the corruption coefficient is not affected substantially.

In Regression (4) a dummy variable is included to verify whether there is a residual in environmental policy stringency specific for the pre-2004 EU members. Indeed, the EU members seem to have slightly stricter environmental policies: the coefficient on the EU dummy is positive though it is significant only at just above 10%. An obvious argument explaining this higher stringency for the EU is the Union's environmental policy that we outlined above. The EU has pushed environmental policy laggards to adopt stricter policies more in line with the forerunners. We notice that again the coefficient on the corruption variable is only slightly affected by the inclusion of additional explanatory variables.

Overall, the econometric evidence presented here suggests, in line with previous findings, that corruption levels negatively affect the stringency of environmental policies. Our estimates suggest that, at a cross-country level, a one standard deviation decrease in the corruption variable is associated with a more than two-thirds improvement in the Environmental Regulatory Regime Index. This association appears to be statistically significant and robust. The income variable is associated with less variation of the Environmental Regulatory Regime Index; a one standard deviation increase in the income proxy is associated with half a standard deviation increase in the ERRI in regression (4), and the statistical significance ranges from 5 to 10%.

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	ERRI	Income	Corruption	Schooling	Urbanization
ERRI	1.00	0.86	−0.92	0.73	0.55
Income		1.00	−0.87	0.78	0.65
Corruption			1.00	−0.76	0.63
Schooling				1.00	0.60
Urbanization					1.00

Table 3. Correlations
All the variables in the table are correlated at 1% level of significance. Number of observations: 59.

It is important to highlight that many of our independent variable are highly correlated and this can cause multicollinearity. This is most obvious when in Regression (3) we introduce the schooling variable and the urbanization variable. These variables are correlated between themselves and they are highly correlated with income levels (see Table 3). This results in an inflation of the standard error of the coefficients of these variables, and a decrease in their statistical significance. Given our sample size, this could be a serious problem when we try to disentangle the effects of the individual variables on environmental policy. It is important to note, however, that the purpose of this paper is not to provide statistical evidence on the whole range of possible determinants of environmental policy, but to test the importance of corruption's influence versus income and to evaluate the impact of corruption and income within the EU countries. Stated positively, the fact that the corruption variable continues to be highly significant in all our regressions can be considered as an extreme test for the relevance of corruption for environmental policy stringency.[12]

Environmental Policies and Institutions in the EU

Now we turn to the implications of the previous analysis for environmental policies in the EU. From Figure 3 we can see that European countries align on the global regression line.[13] In this section we will describe the efforts (and the shortcomings) of the EU to induce the new member and the candidate countries to tackle corruption before accession. We will also briefly touch upon the (lack of a coherent) effort of the EU on this issue with respect to older members. Furthermore, we will apply the results of the previous analysis in order to estimate the effect of corruption on the stringency of environmental policy for European countries.

The Accession Process and its Review: Focus on Corruption

The progress made, by candidate and accession countries, towards integration in the EU has been assessed through regular reports. The core of the criteria used for single country evaluations is the

[12] In any case, when we calculated the variance inflation factor in Regression (4) it was never higher than six (the conventional value for signalling serious multicollinearity is 10), and the variables income and corruption were the variables with the highest values.
[13] Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia are the new EU members and candidates for which the ERRI is available. Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and UK are the pre-2004 EU members for which the ERRI is available.

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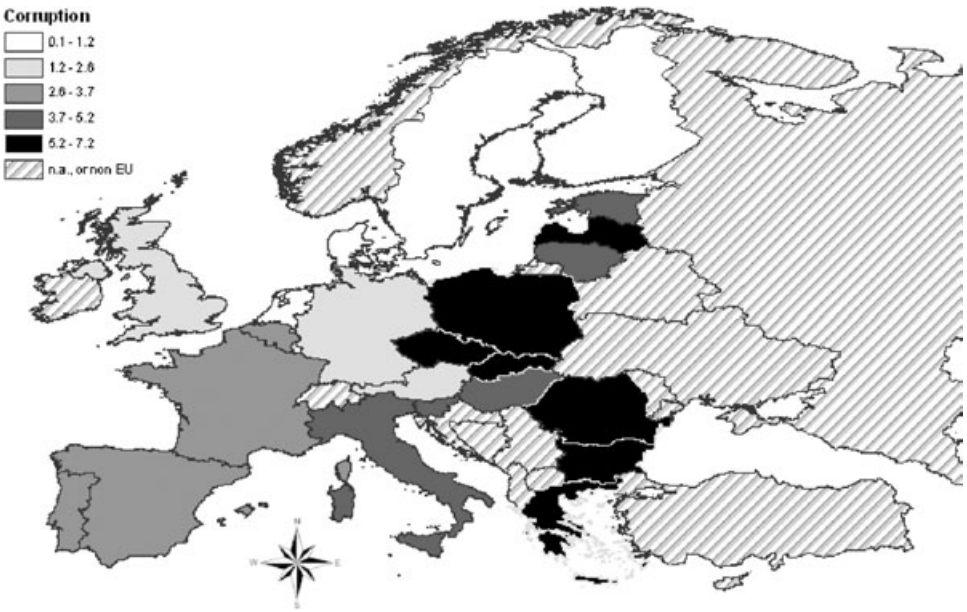

Figure 4. Corruption Perception Index 2001. A darker colour indicates higher perceived corruption. Only countries that are EU members or candidates and for which the ERRI is available are included in the map

so-called 'Copenhagen criteria' (set in 1993 at the Copenhagen European Council).[14] Part of the first criterion is the establishment of the 'rule of the law', which is not compatible with widespread corruption. The reports compiled by the Commission, which are at the basis for the decision 'if and when' countries would be ready to access the Union, have always included corruption levels and trends thereof as central issues. Figure 4 offers a geo-referenced representation of corruption levels across Europe, where it is possible to see that eastern and southern countries are most affected by corruption.

The EU's assessments of corruption levels and trends have been criticized both methodologically and, even more seriously, for their content (Open Society Institute, 2002). The assessment by the Commission is said to lack a coherent framework and the information used for the assessment of countries' performances is derived from different sources and compiled with different methodologies. For example, in some country reports opinion pools have been used as evidence for assessing corruption levels, while in other country reports experts' opinions, or even the actual number of convictions, have been used. Furthermore, these sources have changed between years, and such changes do not support comparison of assessments over time (which appears to be a fundamental requirement for the quality of a yearly assessment of progress towards a goal).

From a more substantial point of view, the lack of a clear benchmark and the weakness of the pressure to tackle corruption are apparently motivated by the fact that some pre-2004 member states would not be able to comply themselves with strict anticorruption frameworks (Open Society Institute, 2002). According to most surveys, the least corrupted of the new members do better than some of EU's founding members. Specifically, according to the Corruption Perception Index 2004, Malta, Estonia, Slovenia and Cyprus are all affected by a lower degree of corruption than Italy and Greece. Already the Commission

[14] The criteria are usually broadly divided into three categories: the political criteria, the economic criteria and the criteria of adoption of the *acquis*. The political criteria refer to the stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities; the economic criteria demand the existence of a functioning market economy as well as the capacity to cope with competitive pressure and market forces within the Union; the criteria of adoption of the *acquis* relate to the ability to take on the obligations of membership including adherence to the aims of political, economic and monetary union.

DOI: 10.1002/eet

has been pushing new members and candidate countries to undertake initiatives to counteract corruption, whereas member states have been reluctant to adopt these same regulations. A good example is the ratification of the 'Criminal Law Convention on Corruption', which the Commission has pressed applicant countries to sign and ratify. As of July 2004, all new members and candidates have ratified, while six out of 15 pre-2004 members still have not ratified it and Spain did not even sign.[15] Greece and Italy, the member countries that have the worst rating in the above-mentioned Corruption Perception Index 2004, are among the countries that did not ratify the convention. From this perspective it is easy to understand why the Commission cannot press the applicant countries too much to fight corruption.

Notwithstanding these caveats, the EU's requirements for accession have induced new and candidate members to undertake several initiatives in order to limit corruption. All the new member states have signed and ratified international conventions and modified their domestic legislation in order to fulfil the formal requirements of the EU. Nevertheless, it is at the implementation levels that some countries have failed to meet the standards of the EU.

Most notably, in the case of Romania's *2004 Regular Report* (Commission of the European Communities, 2004) the picture of progress made to improve on corruption levels – which are rather high – was considered unsatisfactory. A passage deserves a long citation: 'corruption remains a serious and widespread problem in Romania which affects almost all aspects of society. There has been no reduction in perceived levels of corruption and the number of successful prosecutions is low, particularly for high-level corruption. The fight against corruption is hampered by integrity problems even within institutions that are involved in law enforcement and the fight against corruption' (Commission of the European Communities, 2004, p. 21). Furthermore, it must be noted that the report was published on the same day when the Commission confirmed that – thanks to its progress towards integration – Romania's accession date is confirmed to be 1 January 2007.

Looking at the overall corruption levels in new and candidate EU countries, the record of corruption that is depicted by the statistics of Transparency International is discouraging. From Table 4 we see that on average their score is equal to 5.7, while the older members of the EU score 2.5. This is equal to a difference of one standard deviation on the global scale.

	Mean	Standard Deviation	Min	Max
ERRI (old members)	6.86	2.04	2.54	10.00
ERRI (new members and candidates)	3.78	1.21	0.89	4.88
Corruption (old members)	2.54	1.58	0.1	5.8
Corruption (new members and candidates)	5.73	0.91	4.4	7.2
Income (old members)	9.62	0.18	9.22	9.85
Income (new members and candidates)	8.74	0.36	8.17	9.26

Table 4. Descriptive statistics for EU countries
Descriptive statistics for old EU members (14 countries in our sample) and new members together with candidates (10 countries in our sample), as used together with Regression (5) for numerical illustrations in text.

New and Old Member and Candidate States of the EU: Environmental Policies and Corruption Levels

Regression (5) in Table 2 presents the statistical evidence on income, corruption and environmental policy stringency in the enlarged EU. Though regression results with such a small sample of countries as in Regression (5) should be interpreted carefully, together with the global regressions, a robust pattern

[15] http://conventions.coe.int/Treaty/Commun/ChercheSig.asp?NT=173&CM=7&DF=06/07/04&CL=ENG

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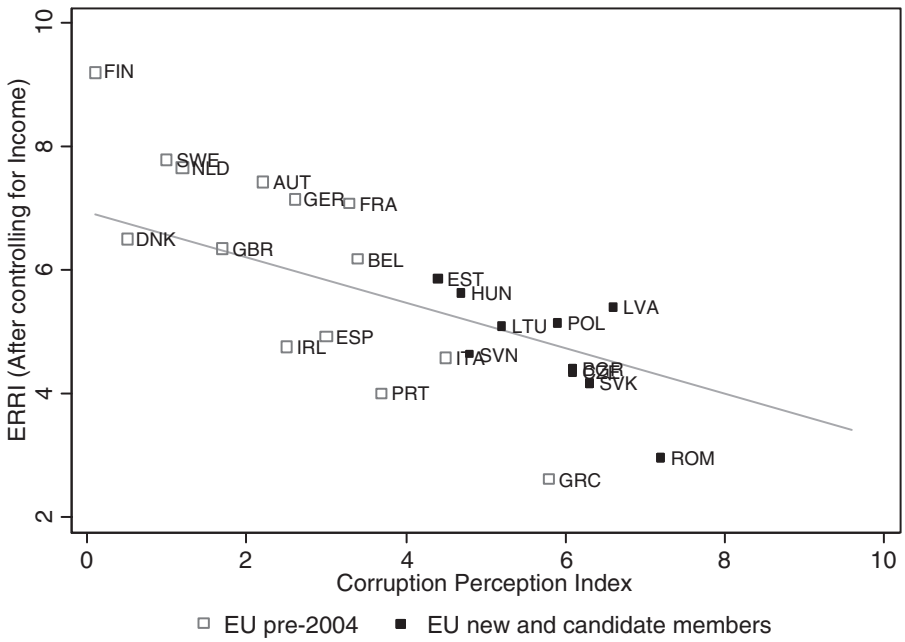

Figure 5. Scatter plot with the Environmental Regulatory Regime Index (adjusted for income) on the *y*-axis and corruption on the *x*-axis

appears. When we compare the coefficients for the EU estimation with the world-wide cross-country evidence – that we presented above – we see that the dynamics of environmental policies within the EU and the candidate countries reflect the global patterns, and specifically we find that corruption is a (negative) determinant of environmental policy stringency levels.[16]

Figure 5 portrays this insight. For this figure, we adjusted the ERRI for income (using the coefficients from Regression (5)), and plotted the adjusted ERRI values against corruption levels. The figure shows a strong correlation between the corruption variable and the environmental policy stringency index. Overall, the new members and candidate countries are grouped at the right-hand side, characterized by higher levels of corruption and lower levels of environmental policy.

To apply the figure to policy, we put in some numbers. For corruption, the gap between the average performance of the old members of the EU and the new and candidate members is 3.2 (5.7 – 2.5; see Table 4). This gap is substantially larger than the standard deviation of the corruption level within each of the groups of the old and new EU members, which is 1.6 and 0.9, respectively (Table 4). Thus, the variance between the groups exceeds the variance within the groups. If Poland were to improve its corruption index (5.9) to the level of Germany (2.6), on the basis of this change alone, we would expect its environmental performance as measured by the ERRI variable to improve by two points.[17] If Poland also increased its income level, from 6224 Euro[18] per capita (in 1997) to 15 266 Euro per capita (the average

[16] From analysing the effect that corruption has on policy-makers in the environmental field, it is also worth mentioning possible future strategic behaviour once the new members states' policy-makers enter the European policy arena more actively. On the one hand, negotiators that are more sensitive to kickbacks could try to stir the process in favour of lobbying interests. On the other hand, undersigning agreements in Brussels does not always entail undertaking the necessary steps to enforce them back home, in which case a more relaxed attitude is foreseeable. Moreover, some EU policies are also supported by endowments for covering their costs. Such funds can create an incentive for corrupt policy-makers to accept these policies in an attempt to embezzle part of the funds. Thus, corruption could further complicate the operations in the EU environmental policy arena, but an in depth analysis of these scenarios is beyond the scope of this paper.

[17] We multiply 2.6 – 5.9 = –3.3 by –0.61 from Regression (5).

[18] For convenience, we use the Euro as monetary unit. We could also use the European Currency Unit (ECU), which was commonly used before 1 January 1999, when it was converted into the Euro at a one-to-one exchange rate (i.e. 1 ECU = 1 Euro).

DOI: 10.1002/eet

income of old EU members in 1997), this would increase the expected ERRI variable by 1.7.[19] Thus, for Poland, catching up with EU low corruption levels can be expected to have more effect on its environmental policies than catching up with EU welfare levels.

The effect would be even stronger when applied to the most corrupt country of the candidates: Romania. If this country were to catch up and improve its corruption index to the average of the pre-2004 EU members (that is, reducing the corruption index from 7.2 to 2.5) it would improve its ERRI by 2.9 points.[20] This alone would improve its position from the 24th position to the 20th in our sample of EU countries.

It must be noted that these calculations are based on coefficients from Regression (5) and they tend to be conservative; they will probably give too low a weight to the importance of corruption, compared with the effect of income increases. When we apply the coefficients from Regression (4), which are based on the largest set of countries for which we have all data, we see that the role of corruption becomes more important relative to the role of income. In general, we consider Regression (4) more reliable, because of the larger sample and of the reduced role for outliers, but we decided to use the coefficients from Regression (5) to make a conservative calculation on corruption's impact on environmental policy.

Conclusions

The accession to the European Union of ten new member states and the likely future membership of more countries – which are currently at the candidate stage – represents a formidable challenge for the institutions of the EU. Not only has the enlargement created a more economically, environmentally and socially diverse EU; the new countries – on average – are also affected by corruption to a higher degree than the pre-2004 members and their progress towards an improvement of their corruption records has produced mixed results. In this section we highlight the effects of these differences on environmental policies, concluding that corruption's influence on environmental policy stringency provides a further rationale for the formulation and implementation of environmental policies at the EU level.

The EU enlargement is easily used as an argument to restrict the role of environmental policies because of the increase in variation in socio-economic and cultural conditions. The presence of different income levels provides impetus to those who argue for a reduced role of supranational environmental policies. Poorer countries should pursue economic objectives first, and only when these objectives are met should they concentrate on environmental quality. Also, increasingly different preferences among EU's citizens towards the environment are likely to arise. Added to income differences, the root of differences in preferences can also lie in variation in culture. It can be argued that each country should be allowed to pursue its own way in order to achieve higher welfare standards according to its own cultural preferences. Finally, the enlargement process also implies an increase in environmental diversity. Thus, while some environmental measures are considered necessities in some countries, they may be superfluous in other countries that have a different environment.[21]

However, these arguments in favour of an allowed diversity in environmental policies too easily neglect a major cause for this diversity: the difference in institutional quality among the countries. Given the numerical results presented above, it is more likely that environmental policies in new EU member states are at a low level because of institutional failure, rather than that this diversity is caused by heterogeneous preferences of residents. The EU environmental provisions could therefore be seen as

[19] We multiply ln(6224) – ln(15 266) = –0.9 by –1.93 from Regression (5).
[20] We multiply 7.2 – 2.5 = –4.7 by –0.61 from Regression (5).
[21] For an example on cross-country differences on opportunities and costs of paper recycling see Berglund *et al.*, 2002.

DOI: 10.1002/eet

a correction of national policy failures. Moreover, as corruption is a pervasive phenomenon, it will take a long period for the new EU member states to catch up with average EU levels, and enforcement of higher environmental standards can then be understood as an early reaping of the fruits thereof. Indeed, the evidence seems sufficiently clear to conclude that the enlarged EU can and should serve as a forum for the advancement and the diffusion of more progressive and stringent environmental policies among member countries (Andersen and Liefferink, 1997). Having said this, we have to recognize that, given an increasing diversity in institutional quality among its members, for the EU to continue its role in improving environmental policy in the member states it may be necessary to limit the role of purposive statements, and to shift emphasis to imposing measurable standards for implementation. Capacity building and governance at the regulatory stage should receive due attention.

In the end, we may turn around the common argument that asks for a delay in environmental policy up to a point where new member states have reached higher income levels. From an optimistic perspective, we should point out that improving a country's institutional quality may render a double dividend when it will be beneficial for environmental quality, as well as for economic growth, thus improving societal welfare twice. Evidence strongly suggests that corruption has negative effects on economic development (Mauro, 1995; Mo, 2001). When a decrease in corruption levels leads to cumulating high growth rates, environmental policy will improve through both the direct channel (captured in the statistical analysis above) and the indirect income channel.

Appendix. Data

	ERRI	Income	Corruption	Schooling	Urbanization
Old EU members					
Austria	8.31	16 601	2.20	8.80	0.65
Belgium	7.08	16 700	3.40	8.73	0.97
Denmark	7.66	18 940	0.50	10.09	0.85
Spain	5.24	12 339	3.00	7.25	0.77
Finland	10.00	15 802	0.10	10.14	0.67
France	7.86	15 680	3.30	8.38	0.75
UK	7.15	15 832	1.70	9.35	0.89
Germany	8.01	16 344	2.60	9.75	0.87
Greece	2.54	10 080	5.80	8.52	0.60
Ireland	5.52	15 536	2.50	9.02	0.59
Italy	5.39	15 961	4.50	7.00	0.67
Netherlands	8.58	16 929	1.20	9.24	0.89
Portugal	4.05	10 720	3.70	4.91	0.63
Sweden	8.65	16 257	1.00	11.36	0.83
New members					
Czech Republic	4.31	10 285	6.10	9.46	0.75
Estonia	4.88	6 292	4.40	–	0.69
Hungary	4.85	6 964	4.70	8.81	0.64
Lithuania	3.75	5 217	5.20	–	0.68
Latvia	4.03	5 120	6.60	–	0.69
Poland	4.14	6 224	5.90	9.90	0.65
Slovakia	3.67	8 070	6.30	9.19	0.57
Slovenia	4.66	10 539	4.80	7.35	0.50
Candidate members					
Bulgaria	2.63	4 171	6.10	9.74	0.69
Romania	0.89	3 546	7.20	9.51	0.56

DOI: 10.1002/eet

ERRI is the Environmental Regulatory Regime Index (Esty and Porter, 2002); the Income variable is the natural logarithm of GDP measured in Euro, adjusted for purchasing power parity, and refers to the year 1997 (Summers and Heston database, version 6.1, available at http://datacentre.chass.utoronto.ca/pwt/; Euro the exchange rate from US dollar to Euro is 1.30801, from Eurostat, available at http://epp.eurostat.cec.eu.int/); the Corruption variable is the Corruption Perception Index, adjusted so that a high score has the intuitive meaning of high levels of perceived corruption (Transparency International, available at http://www.transparency.org/); the Schooling variable is the number of years spent at school, on average, for the population above 25 years old in 2000 (Barro–Lee 'International data on educational attainment' dataset (version updated to April 2000) available at www.cid.harvard.edu/ciddata/ciddata.html); the Urbanization variable is the percentage of the total population that lives in urban areas in 1999 (World Development Indicators 2004 from the World Bank).

Acknowledgements

The research has been funded by the Dutch National Science Foundation (NWO) under contract No. 016.005.040. The authors would like to thank Professor John Proops and Nancy Omtzigt for useful discussions.
We would also like to thank the two referees who substantially contributed to the improvement of the paper.

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DOI: 10.1002/eet